xenos2001ca <sarthur@look.ca> wrote on 16/6/02 2:09 am:

> James P. Hogan's 1996 novel "Paths to Otherwhere" is closely based on
> Deutsch's description of the multiverse and quantum computing. It spins an
> astonishing tale of travel between universes. Deutsch is quoted as saying of
> this novel: "This is hard science fiction at its best... Some of the fictional
> science is so plausible and consistent that I found myself taking up
> pencil and paper to see if it could really work."

Well, yes, and I found it couldn't.

> I was surprised and intrigued to see that quote, and I am very curious to know
> which of the fictional science ideas in Hogan's novel seemed plausible to
> Deutsch.

I meant, whether there was an interesting variant of the laws of quantum mechanics that would make the multiverse be similar to what Hogan imagines. Not whether the laws of quantum mechanics as we currently understand them would permit it -- which they do not.

BTW, pencil, paper, and failed ideas for how physics might work are the bread and butter of a theoretical physicist.

> Most of Hogan's biggest ideas, though thrilling to contemplate, seem to me,
> unfortunately, to be totally refuted by Deutsch himself in "The Fabric of
> Reality." For example, the following ideas would presumably NOT be
> plausible:
>
> 1. The brain as a quantum computer (and only the *human* brain, yet!).
> Deutsch has stated that the brain is a classical computer, not a quantum
> computer.

Yes, and I think that today the idea that the brain is a quantum computer is even less plausible than it was then.

> 2. Time as an absolute reference frame, and as an independent dimension that
> moves -- in the novel, time is exactly synchronized among all universes.
> Deutsch demolishes this concept of time in his chapter 11 "Time: The First
> Quantum Concept" in a way that matches the profound theory developed by
> Barbour in "The End of Time", 1999, i.e., time is only something inferred from
> the details of each instant, each instant being a separate universe, with no
> ordering function imposed from the "outside", so to speak (a Machian universe,
> relative only, no container).

But for that very reason, time need not be an absolute reference frame to make it "synchronised" between at least some universes. It is the ones that are very alike that are most likely to affect each other, and clocks being alike is a major factor in that.

> 3. A "connection" of some sort between the divergent analogs of a person,
> allowing the transfer of memory from a person in one universe to their analog
> in another universe. Since "other times are just special cases of other
> universes" (Deutsch Chapter 11), this transfer is physically equivalent to time
> travel, yet Deutsch states that a time machine can transfer you only back to a
> time when the machine already existed, and in "your" universe.

Yes (though it becomes different subsequently). And that is one reason why, with the real laws of physics, one cannot do what Hogan imagines. However, with different laws, one could.

> Deutsch does not explain why a time machine cannot transfer to a time before
> the machine existed or to a universe in which it does not exist, which I
> understand to be equivalent actions. Can anyone tell me why?

It is because the presence of a time machine (closed timelike line) is a severe distortion of spacetime. Such distortions have to be caused by something in their past. The laws of physics do not allow them to come into existence spontaneously. Therefore the first moment at which the distortion occurred had to be preceded by a smaller distortion in spacetime -- one that was just short of producing a closed timelike line -- and that distortion cannot have arrived through the closed timelike line because it had not yet formed.

> (In addition, biologically the notion of total yet
> reversible memory transfer between two intact
> brains would seem to be impossible anyway.)

But again, Hogan was imagining different laws of physics, laws in which information processing plays an even more central role than it does in the real laws.

> In short, Deutsch's book seemed to me to say
> unequivocally that we cannot ever make trips into
> other universes. Is there any sort of possible
> exception or further theoretical development that
> suggests otherwise?

Not to my knowledge.

-- David Deutsch
http://www.qubit.org/people/david/David.html